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Nathan Schumaker <[redacted]>

RE: Survival with & without barred owls

Anthony, Robert G - FW <robert.anthony@oregonstate.edu> **Thu, Jul 8, 2010 at 9:48 AM**
To: Nathan Schumaker <[redacted]>, "katie.dugger@orst.edu" <katie.dugger@orst.edu>
Cc: Bruce Marcot <brucem@spiritone.com>, Brian Woodbridge <Brian_Woodbridge@fws.gov>, "Brendan_White@fws.gov" <Brendan_White@fws.gov>

Nathan:

My apologies for not responding sooner but Katie and I needed to discuss your email before one of us responded. Since Katie is out of town for the next few days, I will respond to your questions realizing that we may need to discuss the effect of barred owls on spotted owl survival in more detail in a face-to-face meeting. I am sure Katie will add to this message if I omit something important or mis-represent things.

First, it is important to note that the results that Katie sent you were from the meta-analysis of survival rates of adult (stage 3) owls for all of the study areas combined. About 90% of the territorial breeders are adults for all study areas comgined. Most of this data set was collected with a minor influence of barred owls from 1985 to 2003 but with increasing barred owl presence from 2003 to 2008 (see attached table); therefore, we think that the data I gave you under the “OLD” column represents survival rates of spotted owls with little influence from barred owls. Katie used the results from the meta-analysis that Gary White did to compute the estimates of survival or spotted owls in the absence of barred owls (0.8499) and in the presence of barred owls (0.7642), which is a 0.086 decline in survival of spotted owls in the presence of barred owls. This effect may not seem like a large effect, but the dynamics of spotted owl populations are most sensitive to changes in adults survival rates, so this effect will likely reveal some different results. So, all you have to do is subtract this effect of barred owls from the survival data that I gave you from the Forsman et al. manuscript. I have computed the survival rates of spotted owls in the presence of barred owls and added it to the table below, labeled them as “No barred owl” and “barred owl present”, and outlined them in yellow. Those are the values you should use in the HexSIm modeling for survival rates of spotted owls when barred owls are absent versus present. Note that we are assuming that the effect of barred owls on spotted owl survival (0.086 decline))is the same across all age classes and resource levels as we do not have data to suggest otherwise.

Although the effect of barred owls on spotted owl survival from the meta-analysis represents a population level effect, you are applying it as an individual effect in the HexSIm modeling. In addition, you can use the data in the attached table to determine the probability that a spotted owl will encounter a barred owl in any province or study area by using the data for 2008 in the table (also outlined in yellow). Those data represent the proportion of spotted owl territories where barred owls were detected in 2008, the year for which the most recent data were summarized. These data represent an index to barred owl abundance on each of the study areas, and they can be used to represent the probability that spotted owls will encounter barred owls on each of the study areas (provinces.). Armed with these two data sets, I believe you have all of the data you need to simulate the effect of barred owls and spotted owl survival and stability of spotted owl populations.

Let us know if you have any questions about this.

Bob

From: Nathan Schumaker [mailto:[redacted]]
Sent: Tuesday, July 06, 2010 9:38 AM
To: katie.dugger@orst.edu; Anthony, Robert G - FW
Cc: Bruce Marcot; Brian Woodbridge [redacted]
Subject: Survival with & without barred owls

Hi Katie & Bob,

With Bob's help, I've used the Forsman et. al. data to construct the following table for HexSim:

	NO Barred Owl	Barred Owl Present
Stage 0 ; Resource Low	0.366	0.280
Stage 0 ; Resource Med	0.499	0.413
Stage 0 ; Resource High	0.632	0.546
Stage 1 ; Resource Low	0.544	0.458
Stage 1 ; Resource Med	0.718	0.632
Stage 1 ; Resource High	0.795	0.709
Stage 2 ; Resource Low	0.676	0.590
Stage 2 ; Resource Med	0.811	0.725
Stage 2 ; Resource High	0.866	0.780
Stage 3 ; Resource Low	0.819	0.733
Stage 3 ; Resource Med	0.849	0.763
Stage 3 ; Resource High	0.865	0.779

We took the low and high estimates for survival, per stage class, and assigned them to my low and high resource classes. Then I assigned the mean survival rates (again, per stage class) to the medium resource class.

You've since put together survival estimates for NSOs in the absence of barred owls (0.849894) and in the presence of barred owls (0.764236). I've made the assumption that the Forsman et. al. survival data was collected in the presence of barred owls. So I multiplied those values by 0.849894 / 0.764236 = 1.112083 to get the NEW values below:

	OLD	NEW
Stage 0 ; Resource Low	0.366	0.407
Stage 0 ; Resource Med	0.499	0.555
Stage 0 ; Resource High	0.632	0.703
Stage 1 ; Resource Low	0.544	0.605
Stage 1 ; Resource Med	0.718	0.798
Stage 1 ; Resource High	0.795	0.884
Stage 2 ; Resource Low	0.676	0.752
Stage 2 ; Resource Med	0.811	0.902
Stage 2 ; Resource High	0.866	0.963
Stage 3 ; Resource Low	0.819	0.911
Stage 3 ; Resource Med	0.849	0.944
Stage 3 ; Resource High	0.865	0.962

The values in the NEW column are thus assumed to reflect survival rates if there were no barred owls present.

Does this make sense to you? Have I misinterpreted or misused those survival data you sent? I'd appreciate any thoughts you have!

Thanks,

Study area	YEAR	Proportion
CAS	1991	0 007
CAS	1992	0 013
CAS	1993	0 019
CAS	1994	0 041
CAS	1995	0 037
CAS	1996	0 031
CAS	1997	0 055
CAS	1998	0 063
CAS	1999	0 117
CAS	2000	0 121
CAS	2001	0 132
CAS	2002	0 184
CAS	2003	0 162
CAS	2004	0 182
CAS	2005	0 185
CAS	2006	0 213
CAS	2007	0 200
CAS	2008	0 180
CLE	1989	0 105
CLE	1990	0 043
CLE	1991	0 034
CLE	1992	0 141
CLE	1993	0 130
CLE	1994	0 208
CLE	1995	0 211
CLE	1996	0 155
CLE	1997	0 237
CLE	1998	0 256
CLE	1999	0 205
CLE	2000	0 219
CLE	2001	0 268
CLE	2002	0 318
CLE	2003	0 254
CLE	2004	0 203
CLE	2005	0 188
CLE	2006	0 282
CLE	2007	0 181
CLE	2008	0 296
COA	1990	0 020
COA	1991	0 040
COA	1992	0 060
COA	1993	0 090
COA	1994	0 060
COA	1995	0 070
COA	1996	0 130
COA	1997	0 160
COA	1998	0 200
COA	1999	0 220
COA	2000	0 300
COA	2001	0 390
COA	2002	0 420
COA	2003	0 500
COA	2004	0 500
COA	2005	0 520
COA	2006	0 720
COA	2007	0 650
COA	2008	0 700
GDR	1989	0 000
GDR	1990	0 000
GDR	1991	0 000
GDR	1992	0 007
GDR	1993	0 021
GDR	1994	0 029
GDR	1995	0 033
GDR	1996	0 017
GDR	1997	0 000
GDR	1998	0 015
GDR	1999	0 056
GDR	2000	0 059
GDR	2001	0 042
GDR	2002	0 073
GDR	2003	0 085
GDR	2004	0 139
GDR	2005	0 171
GDR	2006	0 227
GDR	2007	0 185
GDR	2008	0 205
HJA	1988	0 015
HJA	1989	0 000
HJA	1990	0 000
HJA	1991	0 037
HJA	1992	0 036
HJA	1993	0 072
HJA	1994	0 088
HJA	1995	0 035
HJA	1996	0 154
HJA	1997	0 068
HJA	1998	0 102
HJA	1999	0 059
HJA	2000	0 105
HJA	2001	0 262
HJA	2002	0 320
HJA	2003	0 337
HJA	2004	0 374
HJA	2005	0 517
HJA	2006	0 523
HJA	2007	0 635
HJA	2008	0 548
HUP	1992	0 073
HUP	1993	0 109
HUP	1994	0 127
HUP	1995	0 091
HUP	1996	0 127
HUP	1997	0 109
HUP	1998	0 164
HUP	1999	0 073
HUP	2000	0 073
HUP	2001	0 127
HUP	2002	0 164
HUP	2003	0 145
HUP	2004	0 164
HUP	2005	0 255
HUP	2006	0 236
HUP	2007	0 327
HUP	2008	0 455
KLA	1990	0 043
KLA	1991	0 020
KLA	1992	0 030
KLA	1993	0 019
KLA	1994	0 009
KLA	1995	0 028
KLA	1996	0 049
KLA	1997	0 017
KLA	1998	0 024
KLA	1999	0 062
KLA	2000	0 103
KLA	2001	0 101
KLA	2002	0 124
KLA	2003	0 134
KLA	2004	0 187
KLA	2005	0 183
KLA	2006	0 219
KLA	2007	0 258
KLA	2008	0 276
NWC	1985	0 000
NWC	1986	0 000
NWC	1987	0 000
NWC	1988	0 000
NWC	1989	0 000
NWC	1990	0 000
NWC	1991	0 000
NWC	1992	0 000
NWC	1993	0 000
NWC	1994	0 000
NWC	1995	0 064
NWC	1996	0 043
NWC	1997	0 032
NWC	1998	0 053
NWC	1999	0 064
NWC	2000	0 085
NWC	2001	0 128
NWC	2002	0 106
NWC	2003	0 106
NWC	2004	0 074
NWC	2005	0 085
NWC	2006	0 128
NWC	2007	0 128
NWC	2008	0 213
OLY	1991	0 032
OLY	1992	0 122
OLY	1993	0 123
OLY	1994	0 054
OLY	1995	0 076
OLY	1996	0 085
OLY	1997	0 151
OLY	1998	0 129
OLY	1999	0 181
OLY	2000	0 191
OLY	2001	0 274
OLY	2002	0 232
OLY	2003	0 305
OLY	2004	0 326
OLY	2005	0 316
OLY	2006	0 337
OLY	2007	0 526
OLY	2008	0 505
RAI	1993	0 130
RAI	1994	0 130
RAI	1995	0 090
RAI	1996	0 120
RAI	1997	0 230
RAI	1998	0 200
RAI	1999	0 160
RAI	2000	0 250
RAI	2001	0 280
RAI	2002	0 300
RAI	2003	0 230
RAI	2004	0 230
RAI	2005	0 270
RAI	2006	0 280
RAI	2007	0 320
RAI	2008	0 320
TYE	1990	0 050
TYE	1991	0 019
TYE	1992	0 038
TYE	1993	0 088
TYE	1994	0 069
TYE	1995	0 082
TYE	1996	0 088
TYE	1997	0 100
TYE	1998	0 144
TYE	1999	0 163
TYE	2000	0 181
TYE	2001	0 244
TYE	2002	0 384
TYE	2003	0 325
TYE	2004	0 488
TYE	2005	0 481
TYE	2006	0 544
TYE	2007	0 619
TYE	2008	0 719

YEAR	CLE	RAI	OLY	COA	HJA	TYE	CAS	KLA	NWC	HUP	GDR
1985										0 000	
1986										0 000	
1987										0 000	
1988						0 015				0 000	
1989	0 105					0 000				0 000	0 000
1990	0 043				0 020	0 000	0 050		0 043	0 000	0 000
1991	0 034			0 032	0 040	0 037	0 019	0 007	0 020	0 000	0 000
1992	0 141			0 122	0 060	0 036	0 038	0 013	0 030	0 000	0 073 0 007
1993	0 130	0 130		0 123	0 090	0 072	0 088	0 019	0 019	0 000	0 109 0 021
1994	0 208	0 130		0 054	0 060	0 088	0 069	0 041	0 009	0 000	0 127 0 029
1995	0 211	0 090		0 076	0 070	0 035	0 082	0 037	0 028	0 064	0 091 0 033
1996	0 155	0 120		0 085	0 130	0 154	0 088	0 031	0 049	0 043	0 127 0 017
1997	0 237	0 230		0 151	0 160	0 068	0 100	0 055	0 017	0 032	0 109 0 000
1998	0 256	0 200		0 129	0 200	0 102	0 144	0 063	0 024	0 053	0 164 0 015
1999	0 205	0 160		0 181	0 220	0 059	0 163	0 117	0 062	0 064	0 073 0 056
2000	0 219	0 250		0 191	0 300	0 105	0 181	0 121	0 103	0 085	0 073 0 059
2001	0 268	0 280		0 274	0 390	0 262	0 244	0 132	0 101	0 128	0 127 0 042
2002	0 318	0 300		0 232	0 420	0 320	0 384	0 184	0 124	0 106	0 164 0 073
2003	0 254	0 230		0 305	0 500	0 337	0 325	0 162	0 134	0 106	0 145 0 085
2004	0 203	0 230		0 326	0 500	0 374	0 488	0 182	0 187	0 074	0 164 0 139
2005	0 188	0 270		0 316	0 520	0 517	0 481	0 185	0 183	0 085	0 255 0 171
2006	0 282	0 280		0 337	0 720	0 523	0 544	0 213	0 219	0 128	0 236 0 227
2007	0 181	0 320		0 526	0 650	0 635	0 619	0 200	0 258	0 128	0 327 0 185
2008	0 296	0 320		0 505	0 700	0 548	0 719	0 180	0 276	0 213	0 455 0 205